# Microclimates With Respect to Upslope and Lake Effect Snow in the Upper Peninsula of Michigan

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The WFO Marquette CWA covers most of the Upper Peninsula of Michigan, along with most of the marine zones across Lake Superior and some zones on Lake Michigan. Terrain elevation can change very quickly over short distances. For example, elevation changes over 800 feet between the shore of Lake Superior and WFO Marquette, which are only 7 miles apart. These elevation changes produce increased lift when combined with appropriate wind directions and speeds, increasing snowfall totals in the higher terrain of Upper Michigan (see figure 1 for the 2008-2009 season snowfall totals).

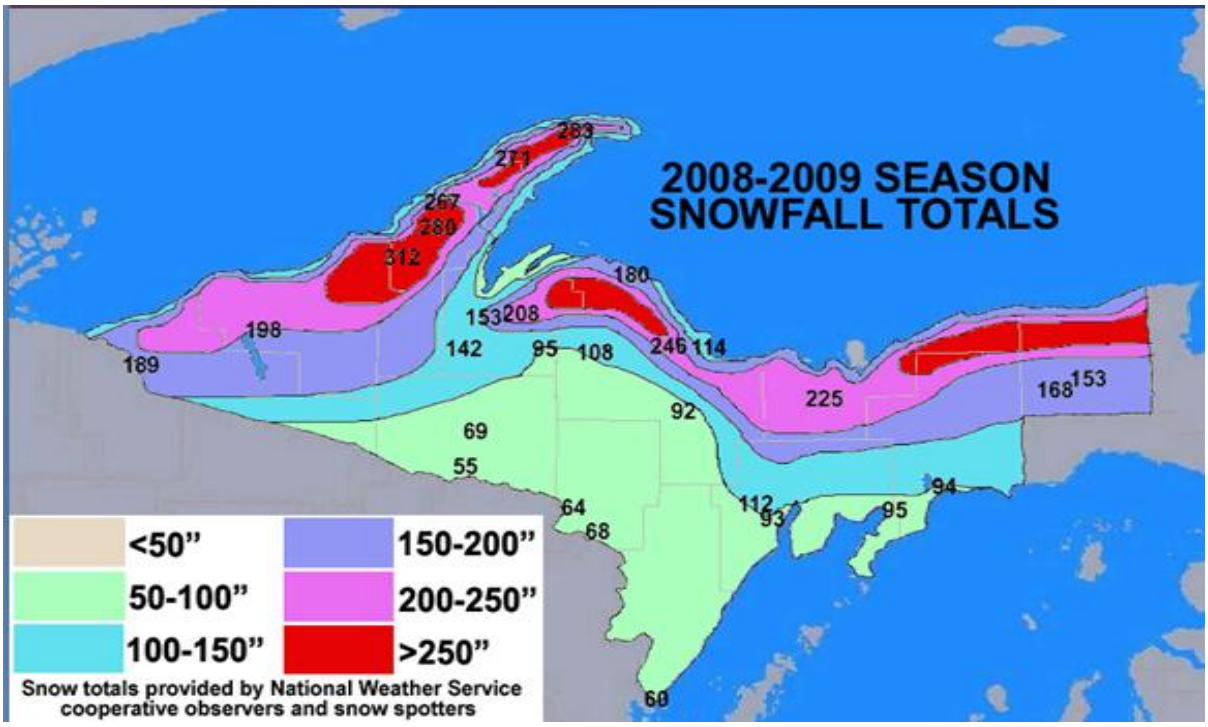


**Figure 1. 2008-2009 Season Snowfall Totals for the MQT CWA.**

Wind plays a crucial role in determining snowfall amounts from lake effect snow (LES) as winds align the LES bands and can concentrate the bands over a relatively small area. In figure 2 (below), radar accurately estimated storm total snowfall amounts over 25 inches over western Alger County in Upper Michigan, while areas a few miles away saw little to no snow from the same event.

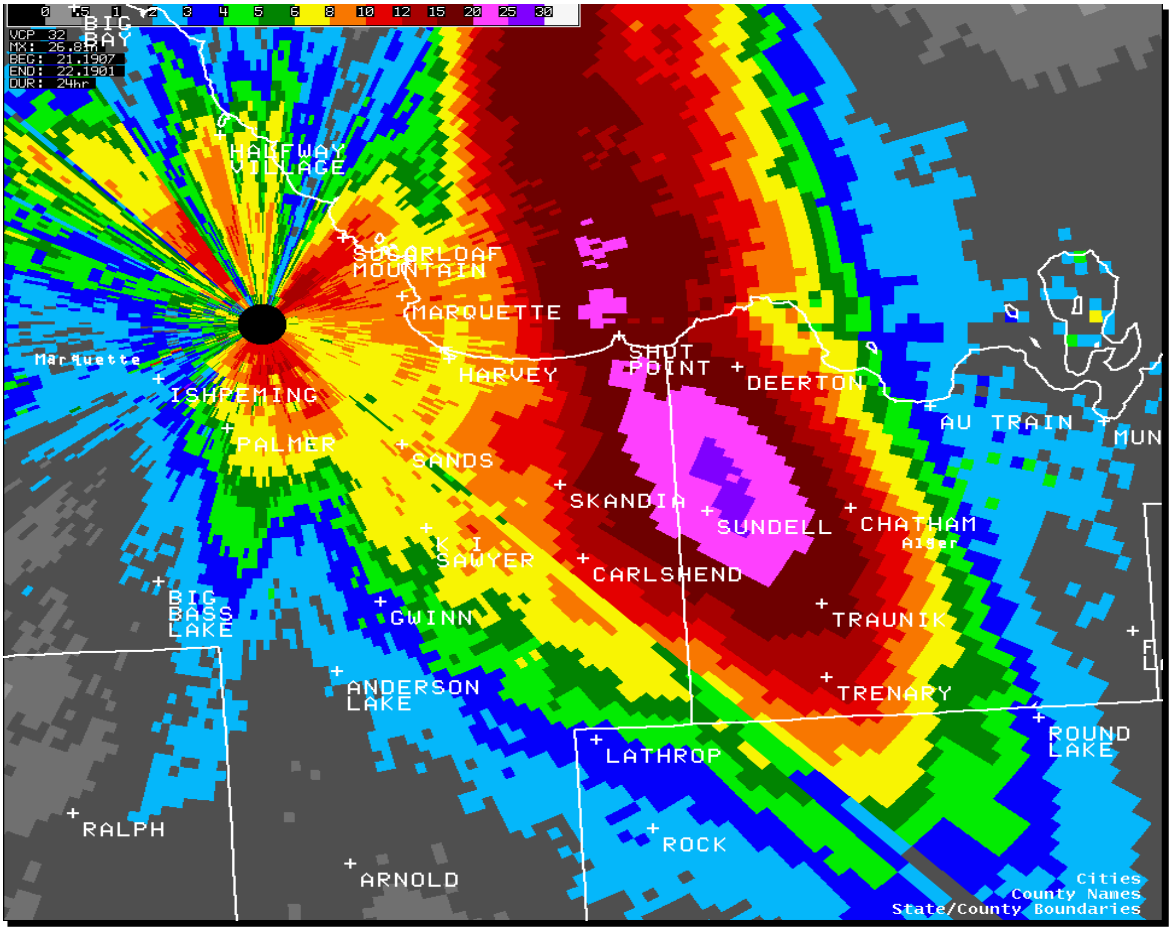


**Figure 2. Radar Estimated Storm Total Snowfall near Marquette, MI.**

Local expertise and knowledge is critical in forecasting LES and other lake effect processes. There are a number of tools used, both in GFE, D2D and elsewhere that are heavily utilized by forecasters at WFO Marquette, but forecaster experience is by far the most important part of the forecast process for LES events.